

WHAT IS CLAIMED IS:

1. An electrospray source of ions for an analyzer comprising:
 - (a) a reservoir for containing a liquid;
 - (b) a manifold for containing a liquid, said manifold having a plurality of
5 nozzles, each of said nozzles having a channel and a plurality of
openings operatively connected to said channel;
 - (c) conduit connecting said reservoir to said manifold so that liquid in said
manifold can flow from said reservoir through the channel of each of
said nozzles and through said openings; and
 - 10 (d) a counter electrode having an electrical potential difference between
said counter electrode and said openings, said electrical potential
difference and the size of said openings being sufficient to enable said
liquid to be ejected from said openings in droplets and to enable ions
to be ejected from said droplets.
- 15 2. The electrospray source of ions as recited in claim 1, wherein there is
a plurality of reservoirs and a plurality of conduits for connected said reservoirs to
said manifold.
- 20 3. The electrospray source of ions as recited in claim 1, wherein said
nozzles are arranged in a pattern so that each of said nozzles is substantially evenly
spaced from adjacent nozzles.
- 25 4. The electrospray source of ions as recited in claim 1, further
comprising an electrode for producing an electric potential at said reservoir to induce
liquid flow from said reservoir to said manifold.
- 30 5. The ion source as recited in claim 1, wherein the major dimension of
each of said openings is from about .1 micrometer to about 20 micrometers.

6. The ion source as recited in claim 1, wherein each of said nozzles has a central longitudinal axis and the central longitudinal axes of said nozzles converge to an area in front of said nozzles.

- 5 7. An electrospray source of ions for an analyzer comprising:
- (a) a reservoir for containing a liquid;
 - (b) a manifold for containing a liquid, said manifold having a plurality of openings;
 - (c) a channel connecting said reservoir to said manifold so that liquid in
10 said reservoir can flow from said reservoir to said openings;
 - (d) an electrode for producing an electric potential at said reservoir to induce liquid flow from said reservoir to said manifold; and
 - (e) a counter electrode having an electrical potential difference between
15 said counter electrode and said openings, said electrical potential difference and the size of said openings being sufficient to enable said liquid to be ejected from said openings in droplets and to enable ejection of ions from said droplets.

- 20 8. The electrospray source of ions as recited in claim 7, wherein the major dimension of each of said openings is from .1 to 20 micrometers.

9. A source of ions for an analyzer comprising:
- (a) a reservoir for containing a liquid;
 - (b) a manifold for containing a liquid, said manifold having a plurality of
25 spaced tips extending in a first direction away from said manifold, each of said tips having an opening to said manifold;
 - (c) a channel connecting said reservoir to said manifold so that liquid in said reservoir can flow from said reservoir to said openings;
 - (d) an electrode for producing an electric potential at said reservoir to
30 induce liquid flow from said reservoir to said manifold; and
 - (e) a counter electrode spaced from said tips in said first direction for producing an electrical potential difference between the liquid in said reservoir and said counter electrode, wherein said electrical potential,

the spacing between said counter electrode and said tips and the size of said openings are effective to enable liquid from said reservoir to be ejected from said openings in droplets and to enable ejection of ions from said droplets.

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10. The electrospray source of ions as recited in claim 9, wherein a major dimension of each of said openings is from about .1 micrometer to about 20 micrometers.

10 11. The electrospray source of ions as recited in claim 9, wherein said tips are arranged in a pattern so that each of said tips is substantially evenly spaced from adjacent tips.

15 12. The electrospray source of ions as recited in claim 9, wherein each of said tips has a central longitudinal axis and the central longitudinal axes of said tips converge to an area in front of said tips.

13. An electrospray source of ions for an analyzer comprising:

- 20 (a) a reservoir for containing a liquid;
- (b) a manifold for containing a liquid, said manifold having a plurality of openings;
- (c) a channel connecting said reservoir to said manifold so that liquid in said reservoir can flow from said reservoir to said openings; and
- 25 (d) a counter electrode assembly having an ion passageway and an electrical potential difference between said counter electrode and said openings, said electrical potential difference and the size of said openings being sufficient to enable said liquid to be ejected from said openings in droplets and to enable ejection of ions from said droplets and transport of said ions through said ion passageway.

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14. The ion source as recited in claim 13, wherein each of said openings is circular and has a diameter from about .1 micrometer to about 20 micrometers.

15. The ion source as recited in claim 14, wherein said manifold further comprises a plurality of spaced tips that contain said openings.

16. The ion source as recited in claim 15, wherein said tips are arranged in
5 a pattern so that each of said tips is substantially evenly spaced from adjacent tips.

17. The ion source as recited in claim 15, wherein said manifold comprises:

- (a) an upper housing connected to said conduit; and
- 10 (b) a lower housing connected to said upper housing and containing said tips.

18. The ion source as recited in claim 17, wherein said lower housing has a plurality of apertures and a plurality of tubes comprising said tips and located in said
15 apertures, each of said tubes having a seal at the aperture through which the tube extends.

19. The ion source as recited in claim 13, further comprising an electrode for producing an electric potential at said reservoir to induce liquid flow from said
20 reservoir to said manifold.

20. A method for producing ions from a liquid for use in a mass analyzer comprising:

- (a) conveying said liquid from a reservoir of said liquid to a manifold;
- 25 (b) conveying said liquid from said manifold to a plurality of openings partly and toward a counter electrode assembly having an ion passageway;
- (c) producing an electrical potential difference between the fluid at said openings and said counter electrode;
- 30 (d) causing said liquid to be ejected from said openings in droplets and ions to be ejected from said droplets; and
- (e) causing said ions to pass through said ion passageway.

21. The method as recited in claim 20, comprising conveying additional liquids from respective additional reservoirs of said additional liquids to said manifold.

5 22. The method as recited in claim 20, wherein said liquid is conveyed from said reservoir to said manifold by producing an electric potential at said reservoir.

10 23. The method as recited in claim 20, wherein the liquid is ejected from said openings toward an area forward of said openings.

24. A mass analyzer comprising:

- 15 (a) a reservoir for containing a liquid;
- (b) a manifold for containing a liquid, said manifold having a plurality of openings;
- (c) a channel connecting said reservoir to said manifold so that liquid in said reservoir can flow from said reservoir to said openings;
- (d) a detector for analyzing ions; and
- 20 (e) a counter electrode between said manifold and said detector and having an electrical potential difference between said counter electrode and said openings, said electrical potential difference and the size of said openings being sufficient to enable said liquid to be ejected from said openings in droplets and to enable ejection of ions from said droplets towards said detector.

25 25. The mass analyzer as recited in claim 24, wherein each of said openings is circular and has a diameter from about .1 micrometer to about 20 micrometers.

30 26. The mass analyzer as recited in claim 25, wherein said manifold further comprises a plurality of spaced tips that contain said openings.

27. The mass analyzer as recited in claim 26, wherein said tips are arranged in a pattern so that each of said tips is evenly spaced from adjacent tips.

28. The mass analyzer as recited in claim 27, wherein each of said tips has
5 a central longitudinal axis and the central longitudinal axes of said tips converge toward said detector.

29. The mass analyzer as recited in claim 26, wherein said manifold comprises:
10 (a) upper housing connected to said conduit; and
(b) a lower housing connected to said upper housing and containing said tips.

30. The mass analyzer as recited in claim 29, wherein said lower
15 housing has a plurality of apertures and a plurality of tubes comprising said tips and located in said apertures, each of said tubes having a seal at the aperture through which the tube extends.

31. The mass analyzer as recited in claim 24, further comprising an
20 electrode for producing an electric potential at said reservoir to induce liquid flow from said reservoir to said manifold.

32. The mass analyzer as recited in claim 24, wherein there is a plurality of reservoirs and a plurality of conduits for connecting said reservoirs to said
25 manifolds.

33. The mass analyzer as recited in claim 22, wherein said nozzles are arranged in a pattern within a circular area and each of said nozzles is evenly spaced from adjacent nozzles.
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34. A method for producing ions from a liquid in a mass analyzer comprising:

- (a) conveying said liquid from reservoir of said liquid to a manifold;
- 5 (b) conveying said liquid from said manifold to a plurality of nozzle tips terminating a respective openings and toward a counter electrode;
- (c) producing an electrical potential difference between the fluid at said openings and said counter electrode;
- 10 (d) causing said liquid to be ejected from said openings in droplets and ions to be ejected from said droplets; and
- (e) causing said ions to be conveyed to a detector for analyzing said ions.

15 35. The method as recited in claim 34, comprising conveying additional liquids from respective additional reservoirs of said additional liquids to said manifold.

20 36. The method as recited in claim 34, wherein said liquid is conveyed from said reservoir to said manifold by producing an electric potential at said reservoir.

25 37. The method as recited in claim 34, wherein the liquid is ejected from said openings so as to converge toward said detector.

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